



**POLITÉCNICA**



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UNIVERSIDAD  
POLITÉCNICA  
DE MADRID

**R&D&i Centres**



## LASER CENTRE UPM

### Contact Data

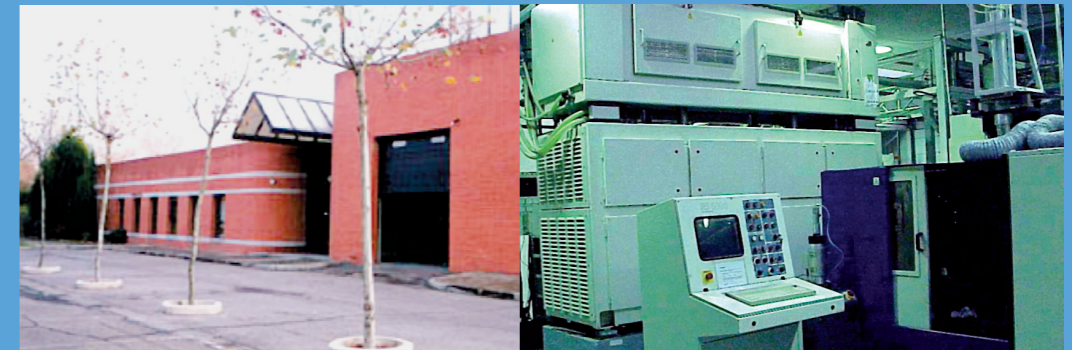
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### Main organizations collaborating with LASER CENTRE UPM

EUROPEAN LASER INSTITUTE  
ISLT (VIENNA; AUSTRIA)  
FHG-ILT (AQUISGRÁN; GERMANY)  
CLFA (ARCUEIL; FRANCE);  
TWI (CAMBRIDGE; UNITED KINGDOM)  
TOSHIBA NRC (YOKOHAMA; JAPAN)  
VITO (MOL; BÉLGIUM)  
WAT-IOPTO (VARSOVIA; POLAND)  
CIDESI (QUERÉTARO; MÉXICO)  
INTA  
EADS-CASA  
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NAVANTIA  
ENRESA  
FAGOR AUTOMATION  
ROFIN BAASEL  
LASING

# LASER CENTRE UPM



Laser Centre of the Universidad Politécnica de Madrid (UPM) was established in 1998 with the foundational aim of constituting a link between the University and the entrepreneurial environment to promote research, development and dissemination of Laser Technology applications.

### TARGETS

R&D&i projects in collaboration with companies and other research centres from the Laser Technology context.

Technological innovation activities in Laser Technology-based industrial processes.

Technical assistance on Laser Technology applications to industrial production processes.

Laser Technology dissemination activities to companies from the industrial environment.

Monographic courses and programmes for theoretical-practical training on Laser Technology at different levels.



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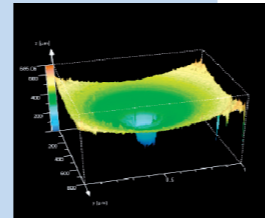
## RESEARCH LINES



### MAIN R&D&i LINES

#### Theoretical modelling, development and instrumentation of power laser and high intensity laser industrial applications

- Cutting, marking, drilling and welding
- Thermal surface treatments and coatings
- Surface ablation and surface cleaning (thermal/thermomechanical)
- Surface treatment by shock waves



#### Development of laser micro/nano-manufacturing processes

- 2D/3D Micromachining of MEMS components
- 2D Micromachining of electronic and photovoltaic devices
- Microforming of high-accuracy metallic elements
- Development of photochemical sensors for analytical applications
- Development of micro/nano structures in metals and polymers



#### Development of advanced laser system instrumentation techniques

- Laser sensor instrumentation in industrial processes
- Development and instrumentation of integrated systems for laser-based material treatment process monitoring and control

#### Development of advanced material characterization techniques

- Testing material properties and mechanical strength (residual stress, tension, fatigue, wear, etc ... , according to several rules)
- Microstructure and composition analysis using SEM-EDX
- Dimensional metrological characterization using confocal microscopy



#### Development of laser-based environmental monitoring techniques

- Spectroscopic analysis of environmental pollutants
- Detection and remote diagnosis of automotive pollutants

### ESPECIALLY INTERESTING R&D&i PROJECTS CARRIED OUT IN THIS CENTRE

- Development and instrumentation of real-time characterization and control exportable systems for laser-based steel welding and surface hardening processes.
- HICARLAW E! 3209. Industrial development and instrumentation of fast laser-based remote welding processes for automotive components.
- SHOCKLAS. Development and instrumentation of metallic material surface treatment processes using laser-generated shock waves as a method to improve its mechanical properties.
- PSE MICROMANUFACTURING: Development of innovative micromanufacturing technologies.
- PSE MICROSIL08: Design and industrialization of thin film silicon photovoltaic modules.
- FP6-STREP PHODYE: Development of scalable photonic micro-sensors.

